FIG. 1

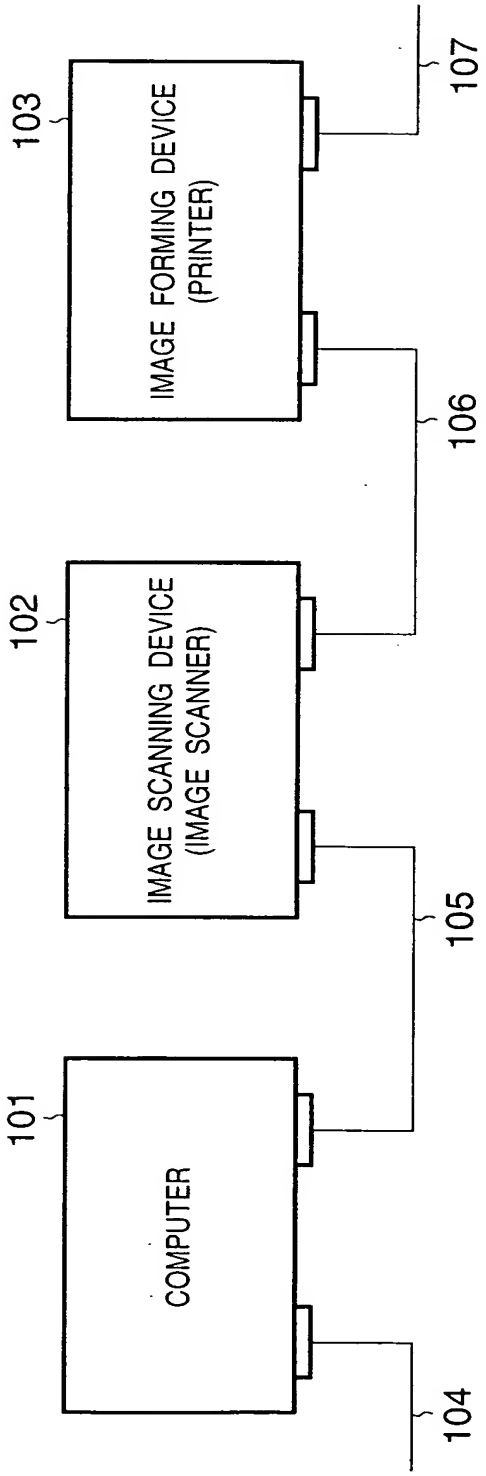

COMPUTER
IMAGE SCANNING DEVICE
(IMAGE SCANNER)
IMAGE FORMING DEVICE
(PRINTER)
101
102
103
104
105
106
107

FIG. 2

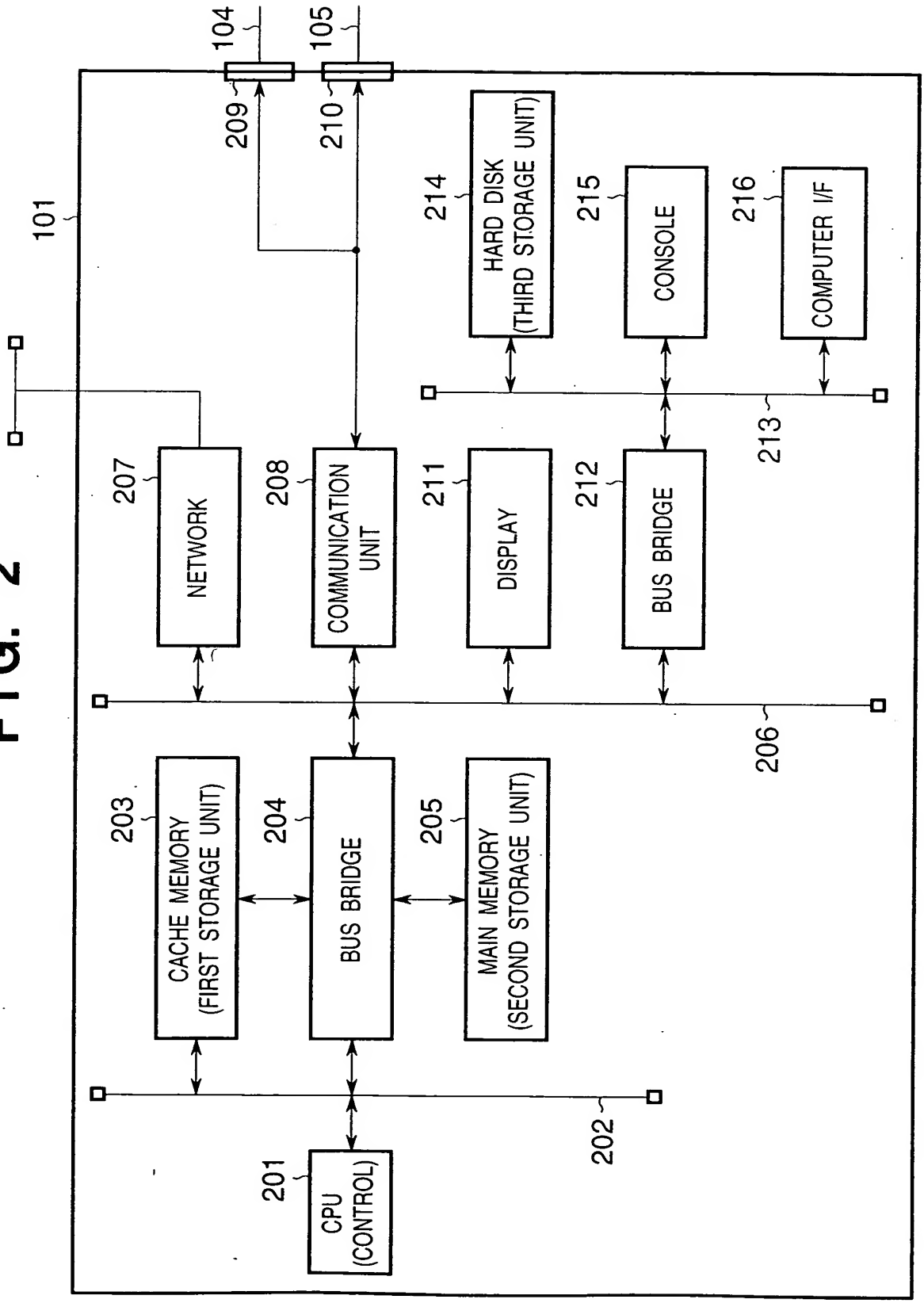

101
104
105
209
210
214
HARD DISK (THIRD STORAGE UNIT)
215
CONSOLE
216
COMPUTER I/F
213
207
NETWORK
208
COMMUNICATION UNIT
211
DISPLAY
212
BUS BRIDGE
206
203
CACHE MEMORY (FIRST STORAGE UNIT)
204
BUS BRIDGE
205
MAIN MEMORY (SECOND STORAGE UNIT)
202
201
CPU (CONTROL)

FIG. 3

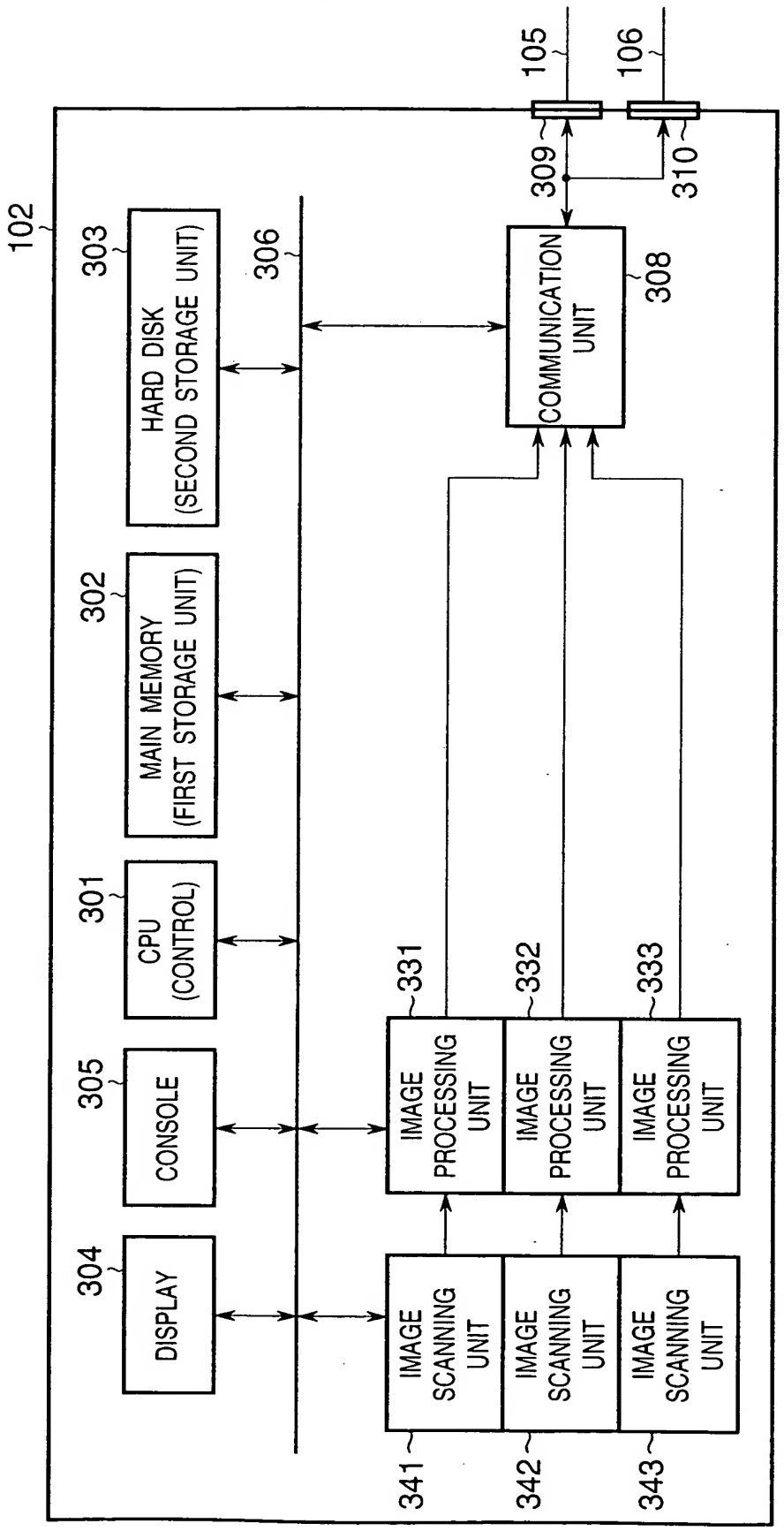
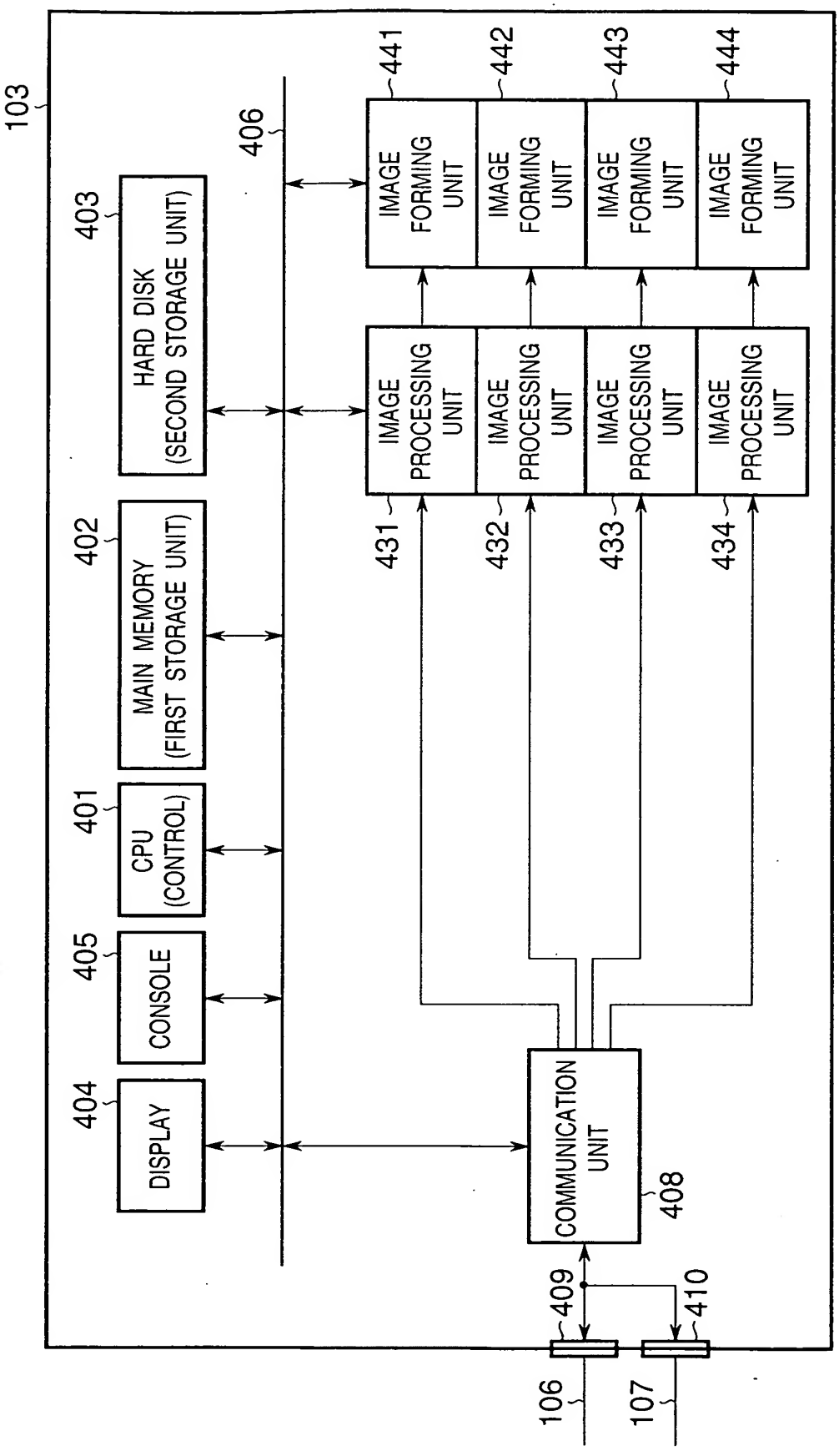

102
105
106
309
310
303
HARD DISK (SECOND STORAGE UNIT)
306
308
COMMUNICATION UNIT
302
MAIN MEMORY (FIRST STORAGE UNIT)
301
CPU (CONTROL)
305
CONSOLE
304
DISPLAY
331
332
333
IMAGE PROCESSING UNIT
IMAGE PROCESSING UNIT
IMAGE PROCESSING UNIT
IMAGE SCANNING UNIT
IMAGE SCANNING UNIT
IMAGE SCANNING UNIT
341
342
343

FIG. 4


103
406
403
HARD DISK (SECOND STORAGE UNIT)
402
MAIN MEMORY (FIRST STORAGE UNIT)
401
CPU (CONTROL)
405
CONSOLE
404
DISPLAY
441
442
443
444
IMAGE FORMING UNIT
IMAGE FORMING UNIT
IMAGE FORMING UNIT
IMAGE FORMING UNIT
IMAGE PROCESSING UNIT
IMAGE PROCESSING UNIT
IMAGE PROCESSING UNIT
IMAGE PROCESSING UNIT
431
432
433
434
COMMUNICATION UNIT
408
409
410
106
107

# FIG. 5

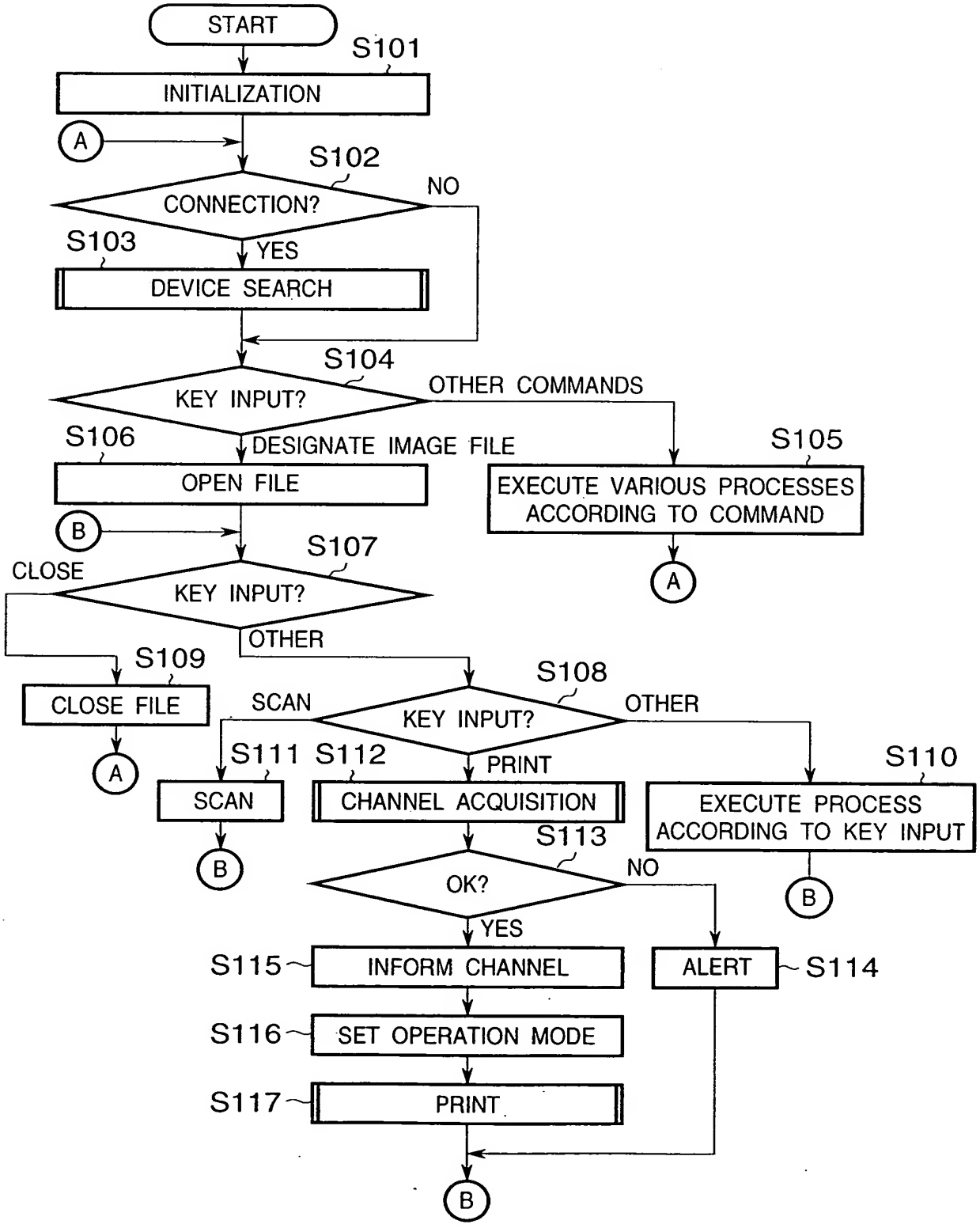
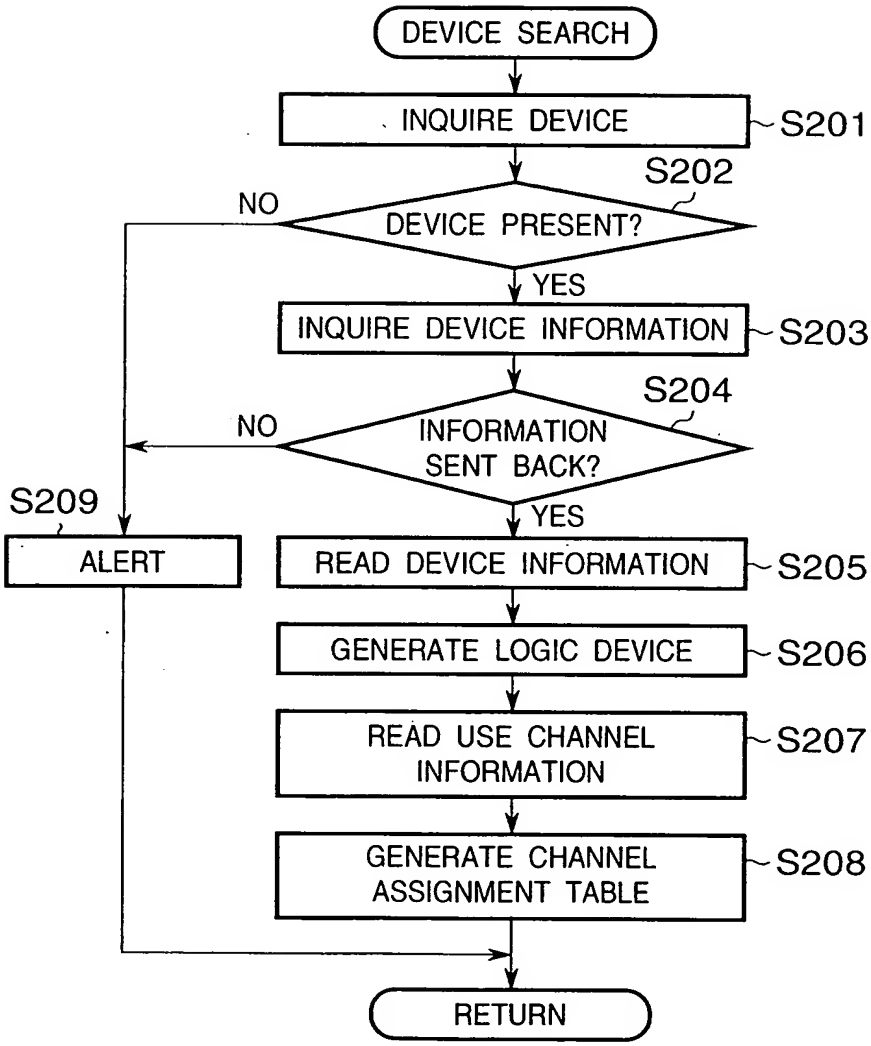
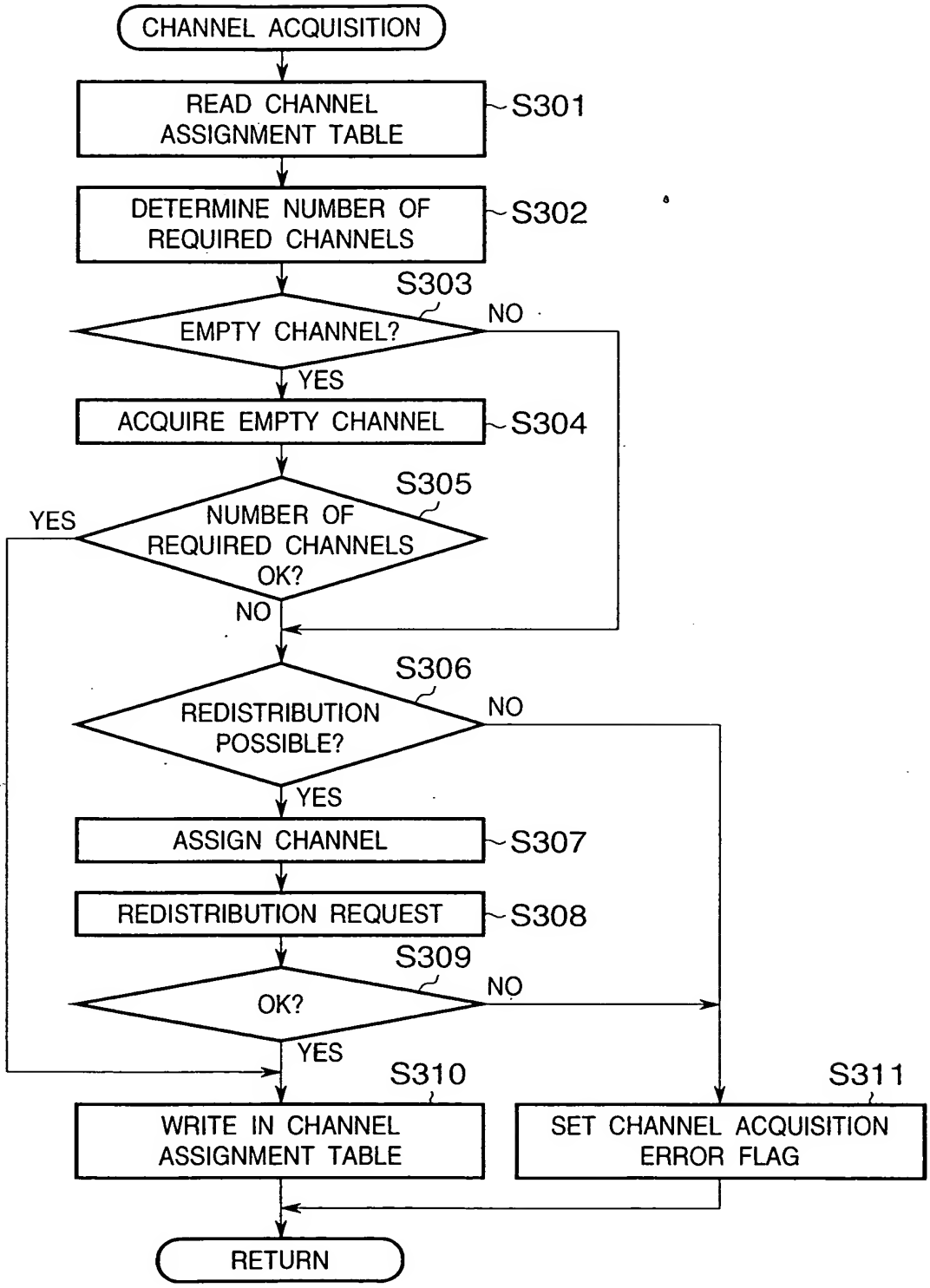

START
S101
INITIALIZATION
A
S102
CONNECTION?
NO
YES
S103
DEVICE SEARCH
S104
KEY INPUT?
OTHER COMMANDS
DESIGNATE IMAGE FILE
S106
OPEN FILE
S105
EXECUTE VARIOUS PROCESSES ACCORDING TO COMMAND
A
B
S107
CLOSE
KEY INPUT?
OTHER
S109
CLOSE FILE
S108
SCAN
KEY INPUT?
OTHER
A
S111
S112
PRINT
S110
SCAN
CHANNEL ACQUISITION
EXECUTE PROCESS ACCORDING TO KEY INPUT
S113
B
OK?
NO
B
YES
S115
INFORM CHANNEL
ALERT
S114
S116
SET OPERATION MODE
S117
PRINT
B

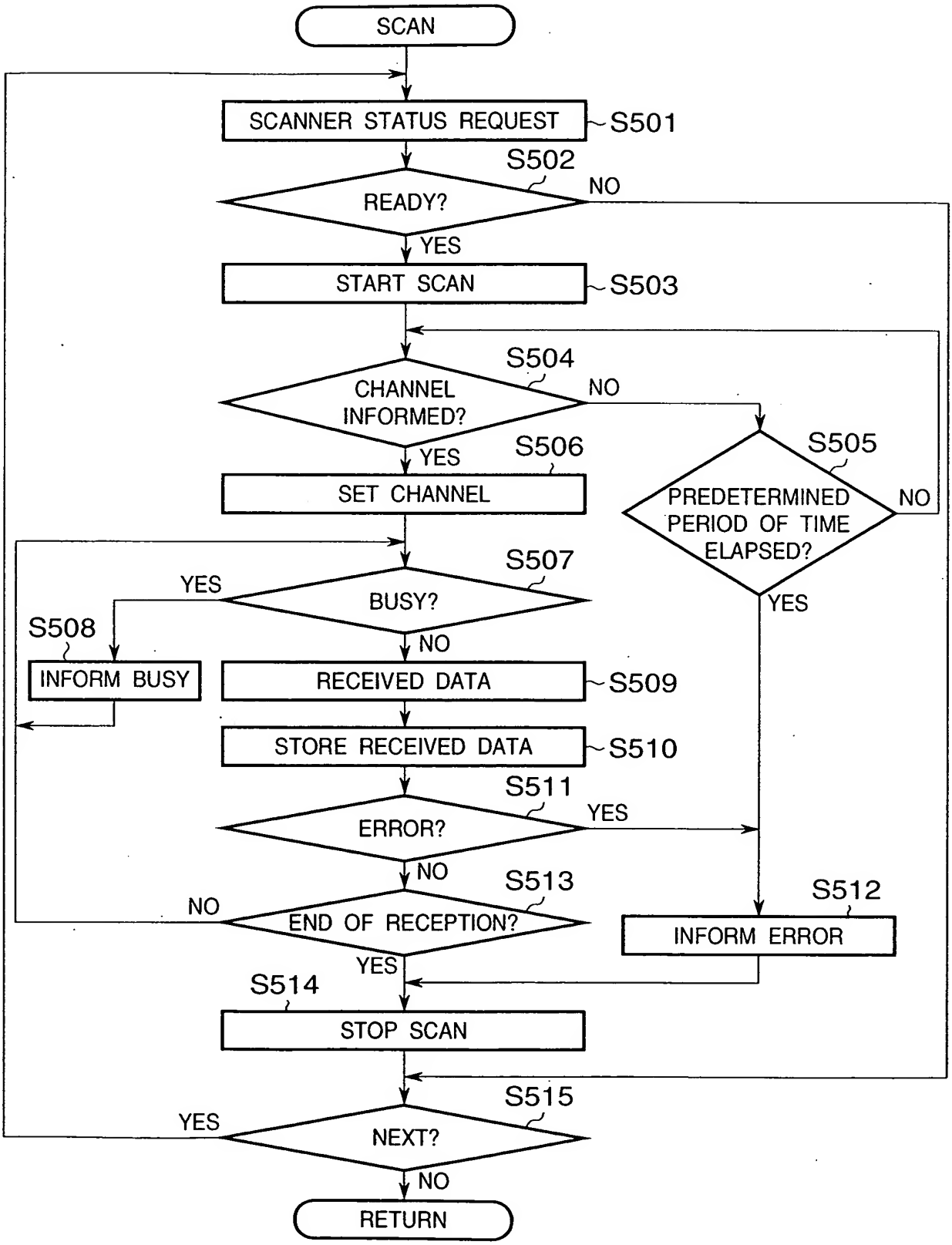
FIG. 6


DEVICE SEARCH
INQUIRE DEVICE
S201
S202
NO
DEVICE PRESENT?
YES
INQUIRE DEVICE INFORMATION
S203
S204
NO
INFORMATION SENT BACK?
YES
S209
ALERT
READ DEVICE INFORMATION
S205
GENERATE LOGIC DEVICE
S206
READ USE CHANNEL INFORMATION
S207
GENERATE CHANNEL ASSIGNMENT TABLE
S208
RETURN

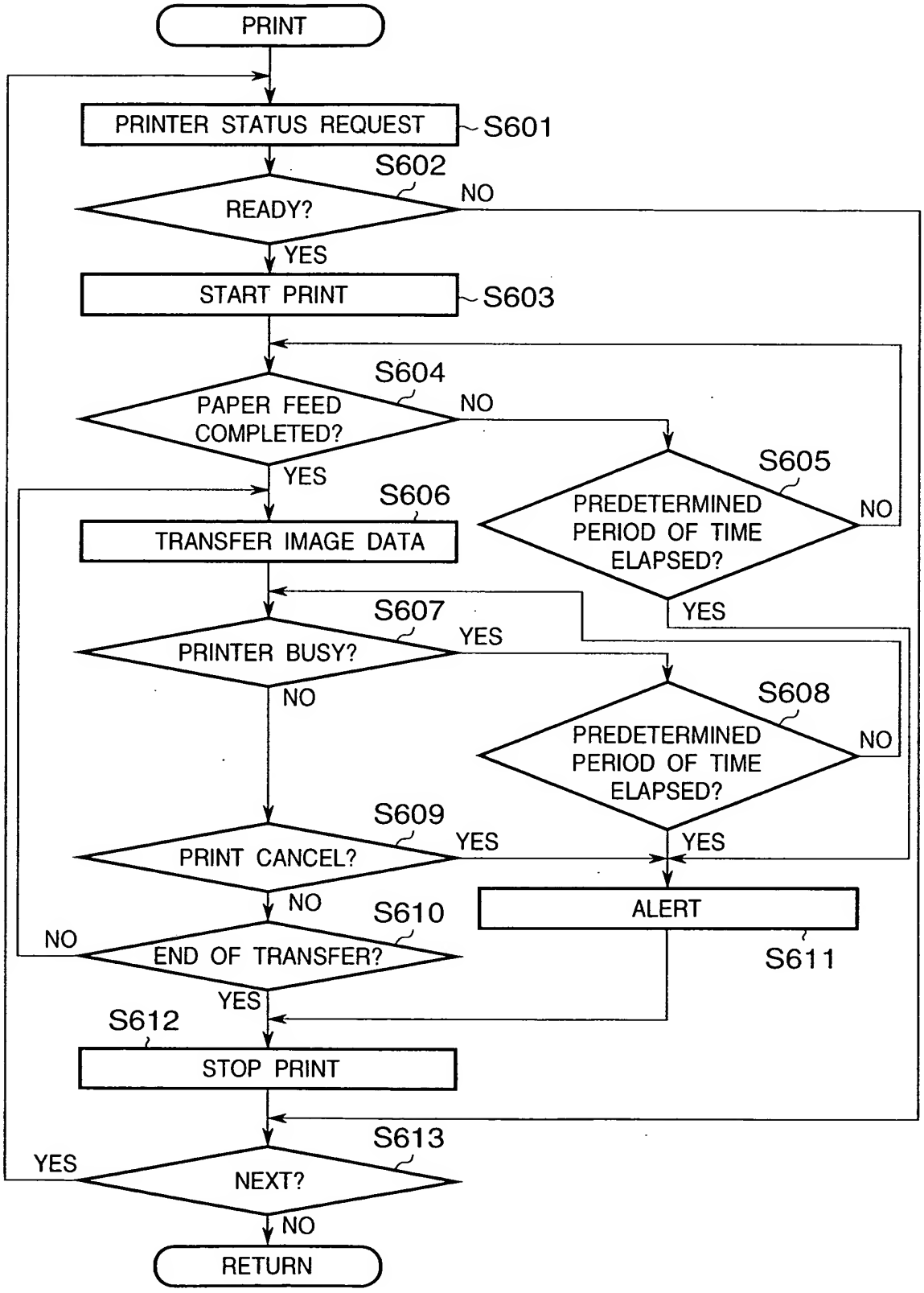
# FIG. 7


CHANNEL ACQUISITION
READ CHANNEL ASSIGNMENT TABLE
S301
DETERMINE NUMBER OF REQUIRED CHANNELS
S302
S303
EMPTY CHANNEL?
NO
YES
ACQUIRE EMPTY CHANNEL
S304
S305
NUMBER OF REQUIRED CHANNELS OK?
YES
NO
S306
REDISTRIBUTION POSSIBLE?
NO
YES
ASSIGN CHANNEL
S307
REDISTRIBUTION REQUEST
S308
S309
OK?
NO
YES
S310
WRITE IN CHANNEL ASSIGNMENT TABLE
S311
SET CHANNEL ACQUISITION ERROR FLAG
RETURN

# FIG. 8


SCAN
SCANNER STATUS REQUEST
S501
S502
READY?
NO
YES
START SCAN
S503
S504
CHANNEL INFORMED?
NO
YES
S506
SET CHANNEL
S505
PREDETERMINED PERIOD OF TIME ELAPSED?
NO
YES
S507
BUSY?
YES
NO
S508
INFORM BUSY
RECEIVED DATA
S509
STORE RECEIVED DATA
S510
S511
ERROR?
YES
NO
S513
END OF RECEPTION?
NO
YES
S512
INFORM ERROR
S514
STOP SCAN
S515
NEXT?
YES
NO
RETURN

# FIG. 9


PRINT
PRINTER STATUS REQUEST
S601
S602
READY?
NO
YES
START PRINT
S603
S604
PAPER FEED COMPLETED?
NO
YES
S605
PREDETERMINED PERIOD OF TIME ELAPSED?
NO
YES
S606
TRANSFER IMAGE DATA
S607
PRINTER BUSY?
YES
NO
S608
PREDETERMINED PERIOD OF TIME ELAPSED?
NO
YES
S609
PRINT CANCEL?
YES
NO
ALERT
S611
S610
END OF TRANSFER?
NO
YES
S612
STOP PRINT
S613
NEXT?
YES
NO
RETURN

# FIG. 10

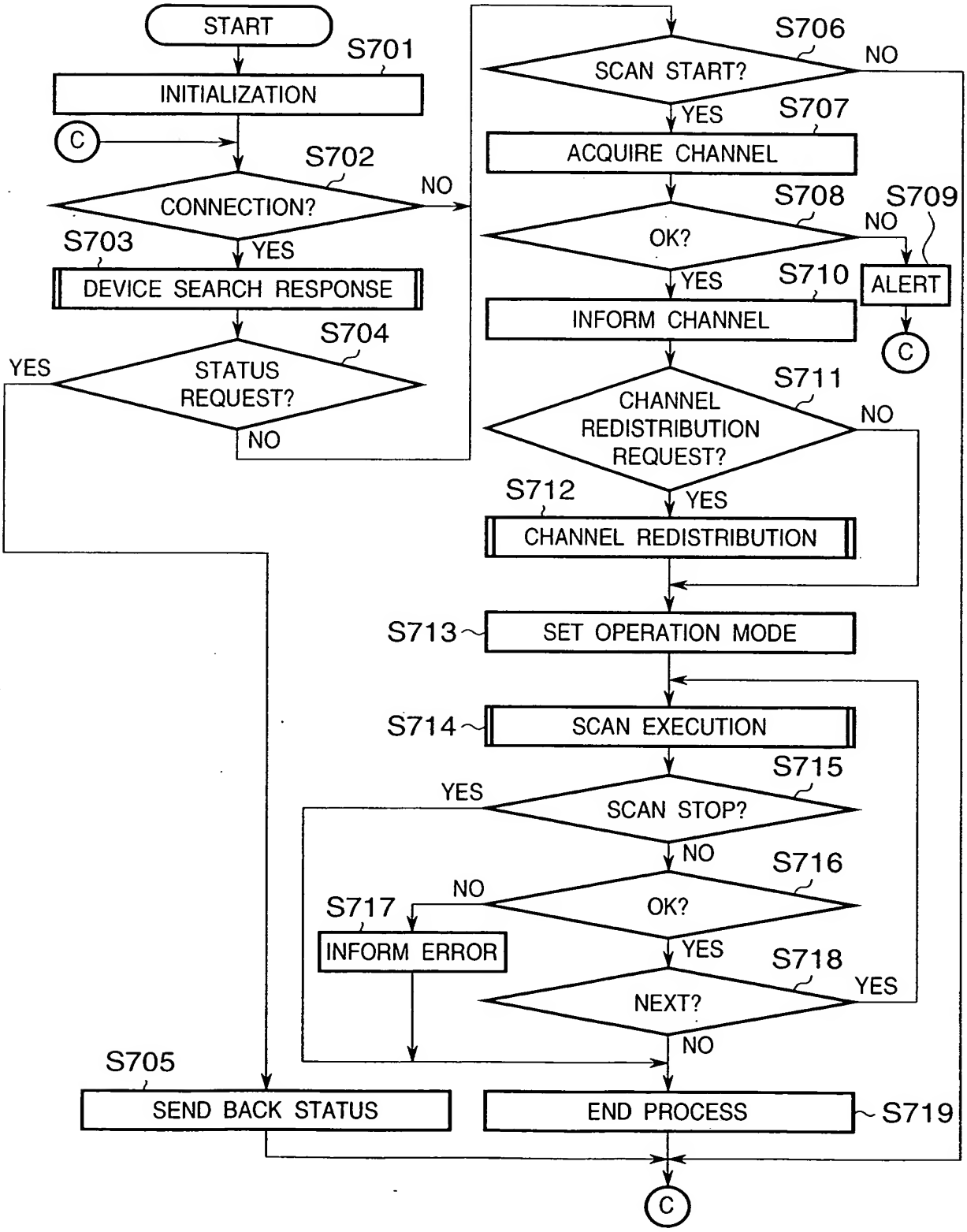

START
S701
INITIALIZATION
C
S702
CONNECTION?
NO
YES
S703
DEVICE SEARCH RESPONSE
S704
STATUS REQUEST?
YES
NO
S706
SCAN START?
NO
YES
S707
ACQUIRE CHANNEL
S708
OK?
NO
S709
ALERT
C
YES
S710
INFORM CHANNEL
S711
CHANNEL REDISTRIBUTION REQUEST?
NO
YES
S712
CHANNEL REDISTRIBUTION
S713
SET OPERATION MODE
S714
SCAN EXECUTION
S715
SCAN STOP?
YES
NO
S716
OK?
NO
S717
INFORM ERROR
YES
S718
NEXT?
YES
NO
S705
SEND BACK STATUS
END PROCESS
S719
C

FIG. 11

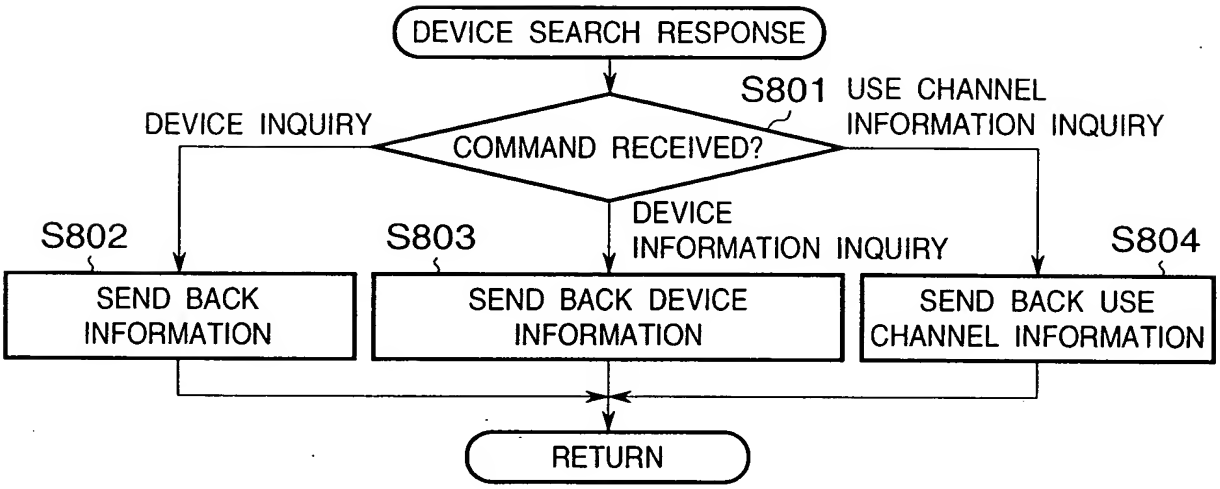

DEVICE SEARCH RESPONSE
S801
COMMAND RECEIVED?
DEVICE INQUIRY
USE CHANNEL INFORMATION INQUIRY
DEVICE INFORMATION INQUIRY
S802
S803
S804
SEND BACK INFORMATION
SEND BACK DEVICE INFORMATION
SEND BACK USE CHANNEL INFORMATION
RETURN

FIG. 12

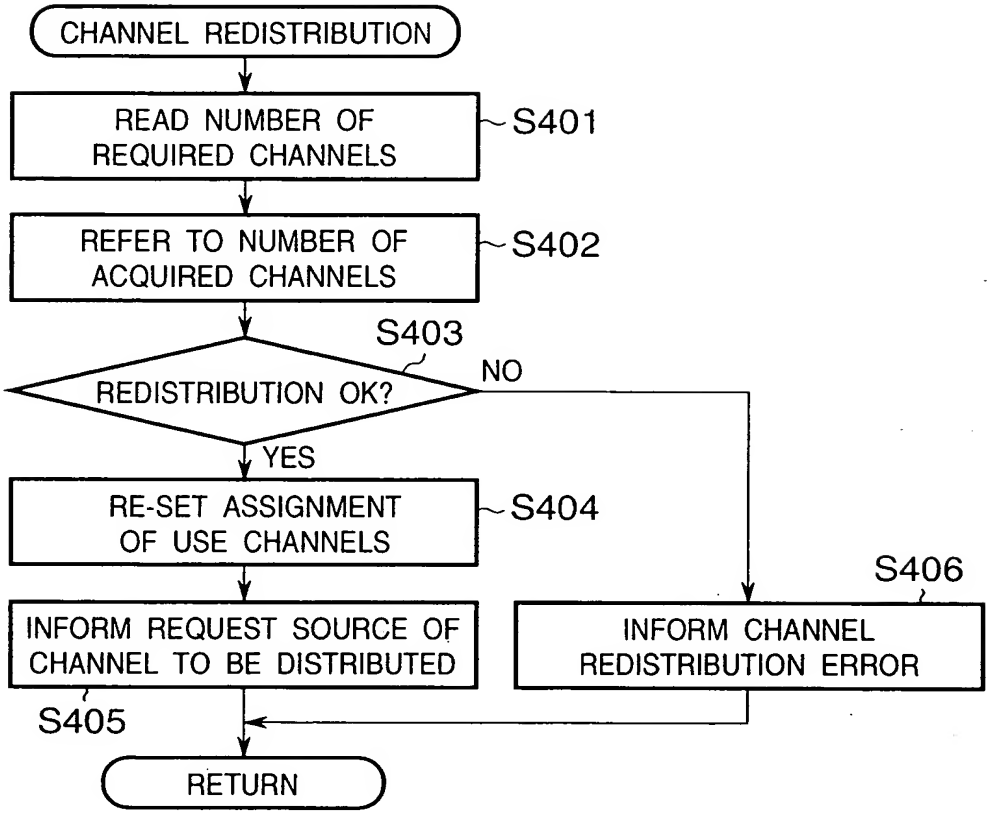

CHANNEL REDISTRIBUTION
READ NUMBER OF REQUIRED CHANNELS
S401
REFER TO NUMBER OF ACQUIRED CHANNELS
S402
S403
REDISTRIBUTION OK?
NO
YES
RE-SET ASSIGNMENT OF USE CHANNELS
S404
S406
INFORM REQUEST SOURCE OF CHANNEL TO BE DISTRIBUTED
INFORM CHANNEL REDISTRIBUTION ERROR
S405
RETURN

FIG. 13

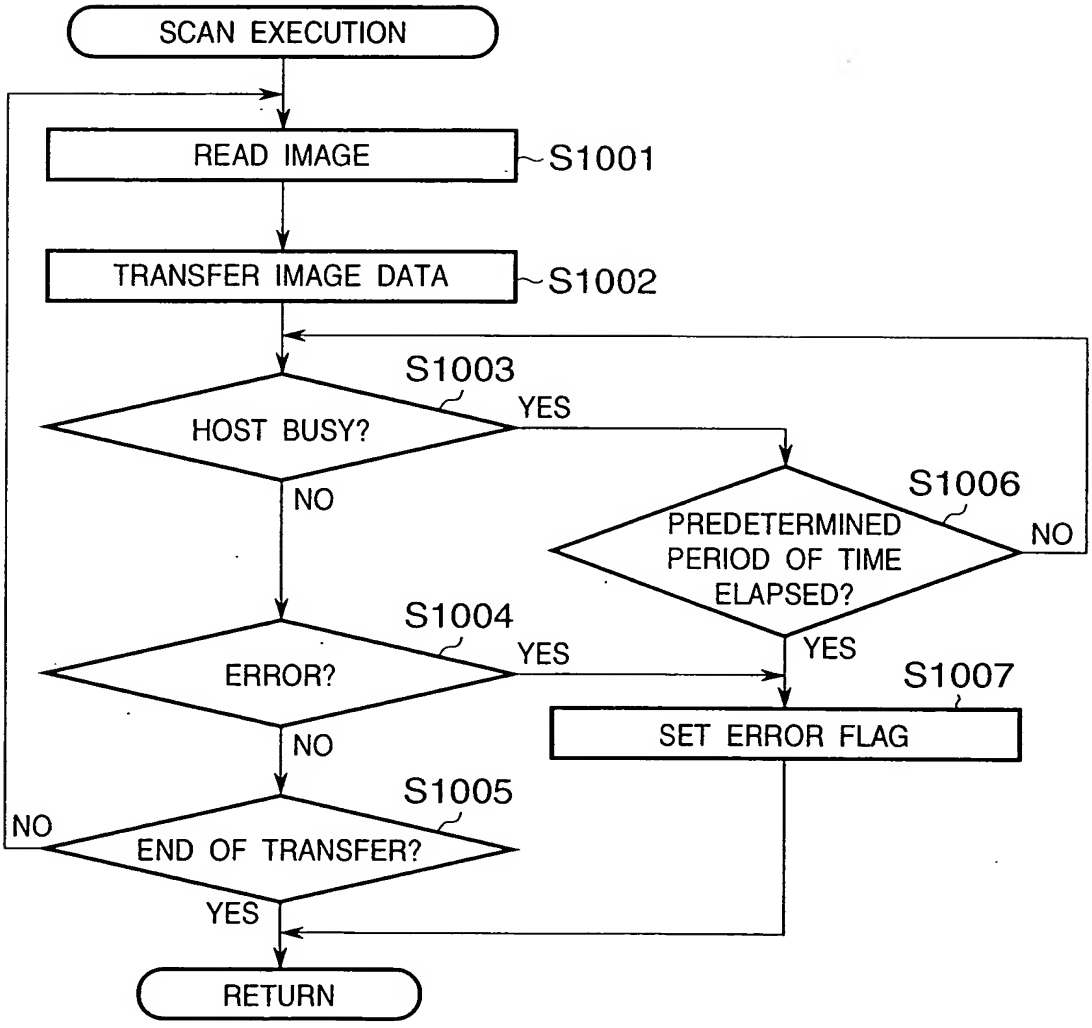
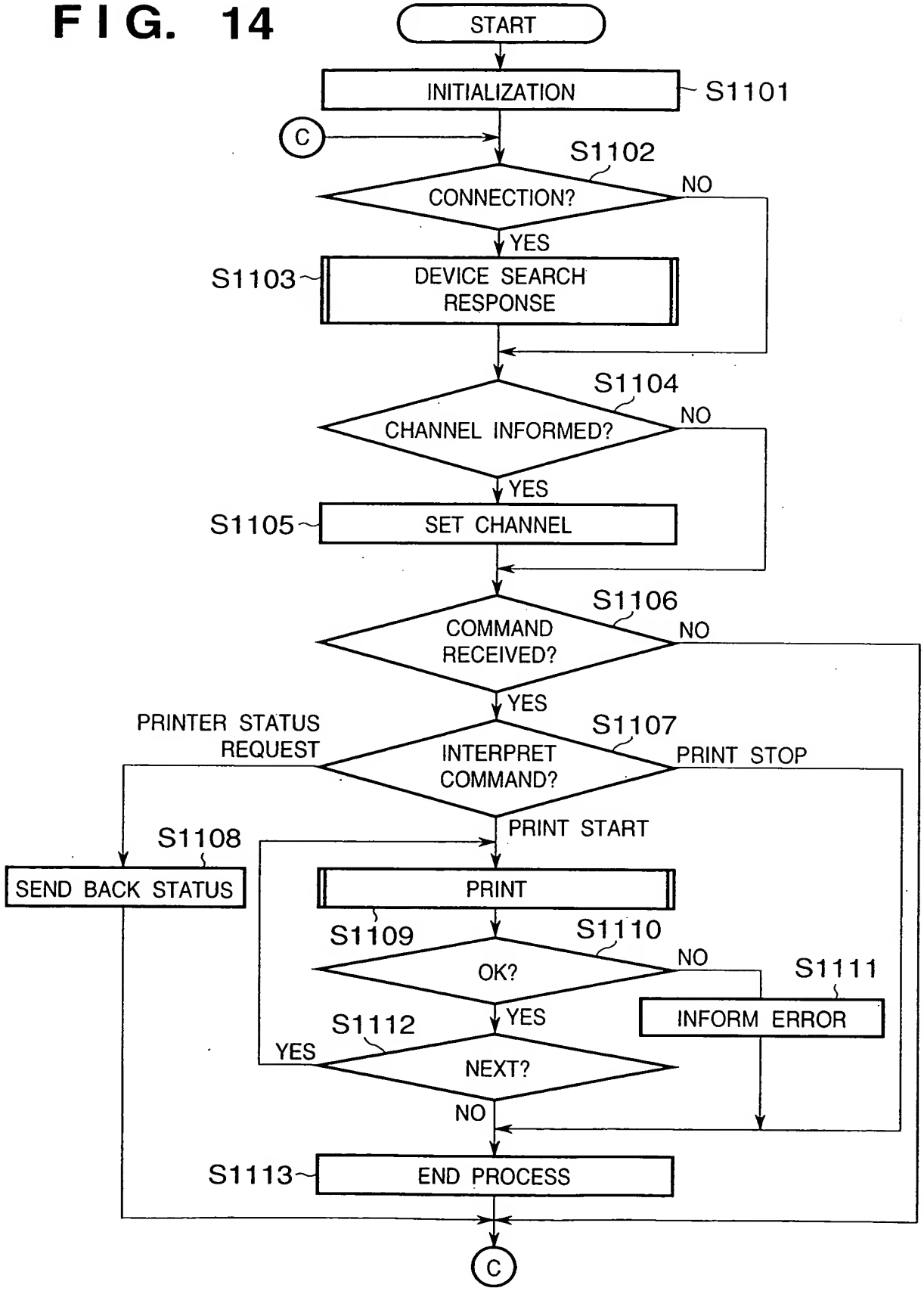

SCAN EXECUTION
READ IMAGE
S1001
TRANSFER IMAGE DATA
S1002
S1003
HOST BUSY?
YES
NO
S1006
PREDETERMINED PERIOD OF TIME ELAPSED?
NO
YES
S1004
ERROR?
YES
NO
S1007
SET ERROR FLAG
S1005
END OF TRANSFER?
NO
YES
RETURN

FIG. 14


START
INITIALIZATION
S1101
C
S1102
CONNECTION?
NO
YES
S1103
DEVICE SEARCH RESPONSE
S1104
CHANNEL INFORMED?
NO
YES
S1105
SET CHANNEL
S1106
COMMAND RECEIVED?
NO
YES
PRINTER STATUS REQUEST
S1107
INTERPRET COMMAND?
PRINT STOP
PRINT START
S1108
SEND BACK STATUS
PRINT
S1109
S1110
OK?
NO
S1111
INFORM ERROR
YES
S1112
YES
NEXT?
NO
S1113
END PROCESS
C

# FIG. 15

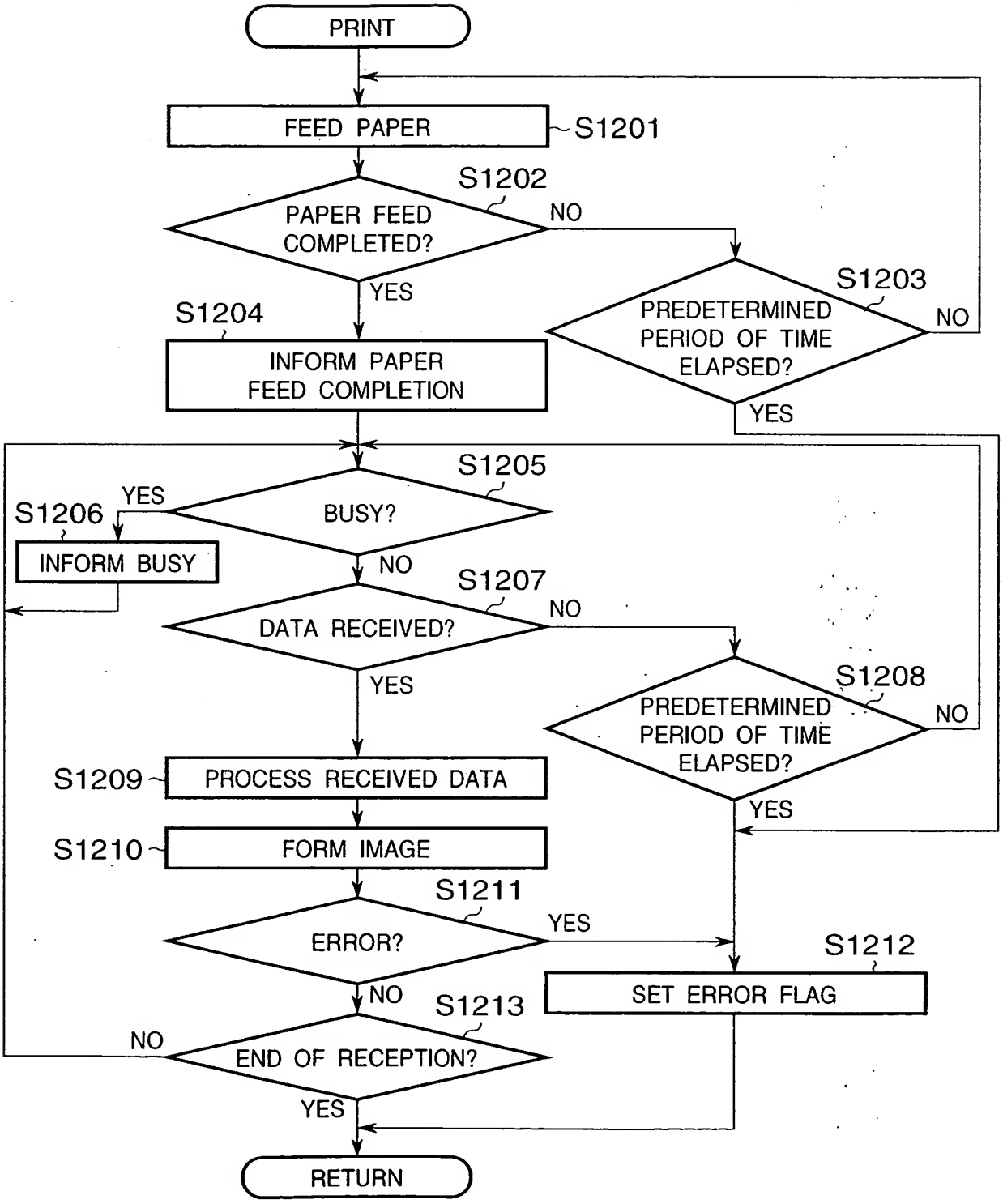

PRINT
FEED PAPER
S1201
S1202
PAPER FEED COMPLETED?
NO
YES
S1203
PREDETERMINED PERIOD OF TIME ELAPSED?
NO
YES
S1204
INFORM PAPER FEED COMPLETION
S1205
BUSY?
YES
S1206
INFORM BUSY
NO
S1207
DATA RECEIVED?
NO
YES
S1208
PREDETERMINED PERIOD OF TIME ELAPSED?
NO
YES
S1209
PROCESS RECEIVED DATA
S1210
FORM IMAGE
S1211
ERROR?
YES
NO
S1212
SET ERROR FLAG
S1213
END OF RECEPTION?
NO
YES
RETURN

FIG. 16

| DEVICE | NUMBER OF ACQUIRED CHANNELS |
|---|---|
| SCANNER B | 3 |
| HOST C | 4 |
| PRINTER A | 0 |
| PRINTER B | 1 |
| . | . |
| . | . |

FIG. 17

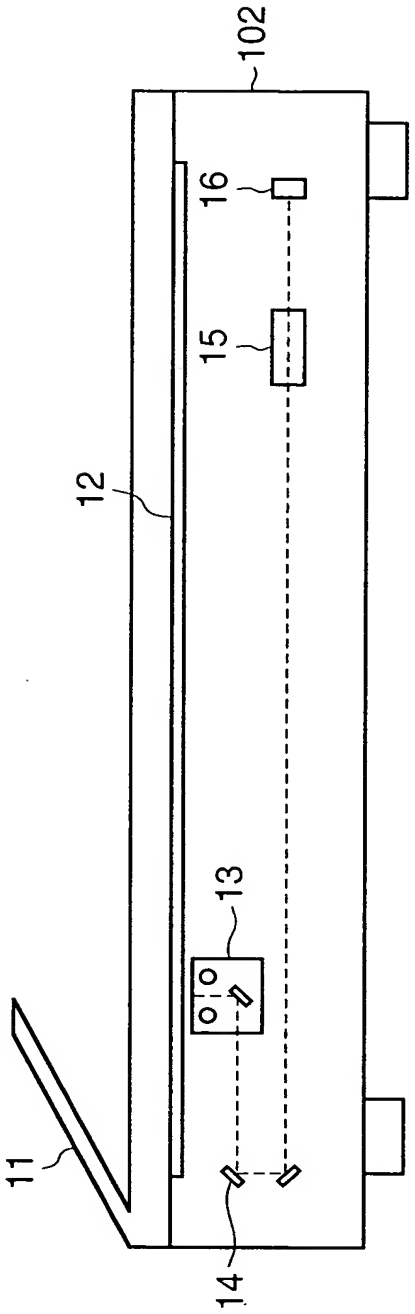


FIG. 18

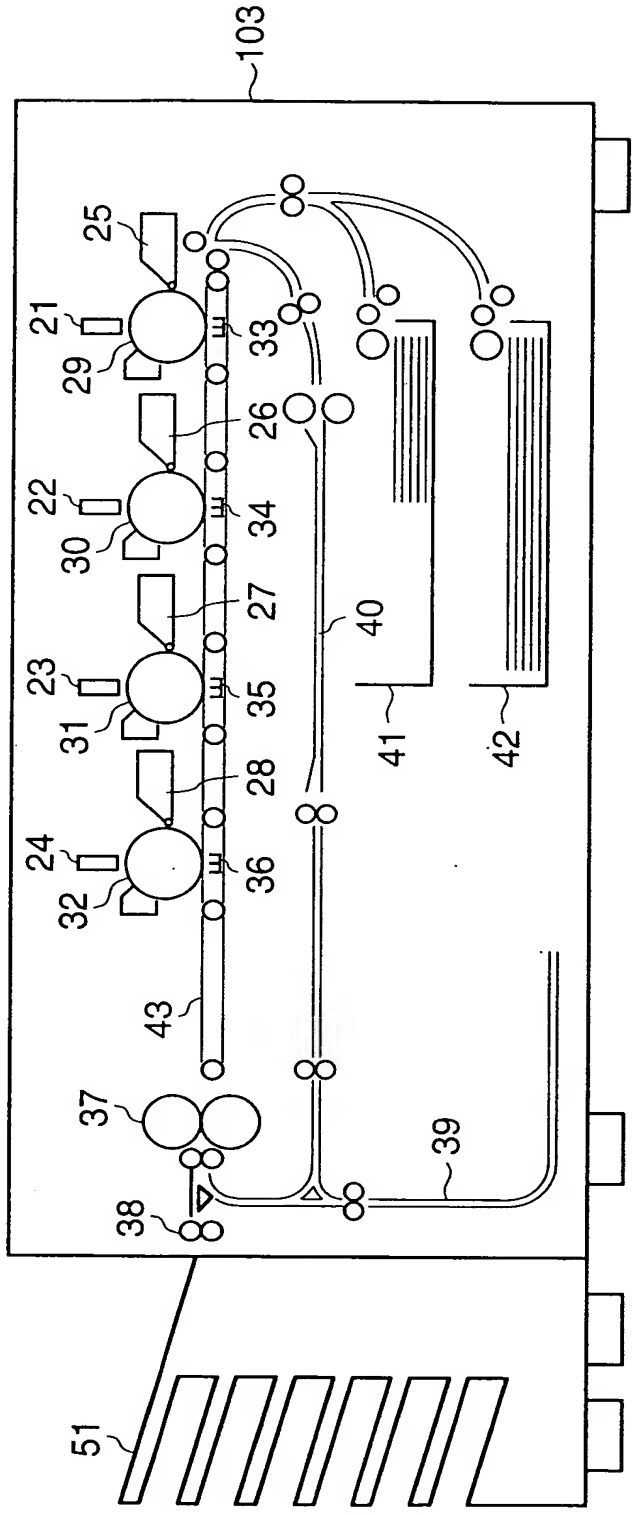

103
25
21
29
33
26
22
30
34
27
40
23
31
35
41
42
28
24
32
36
43
37
39
38
51

FIG. 19A

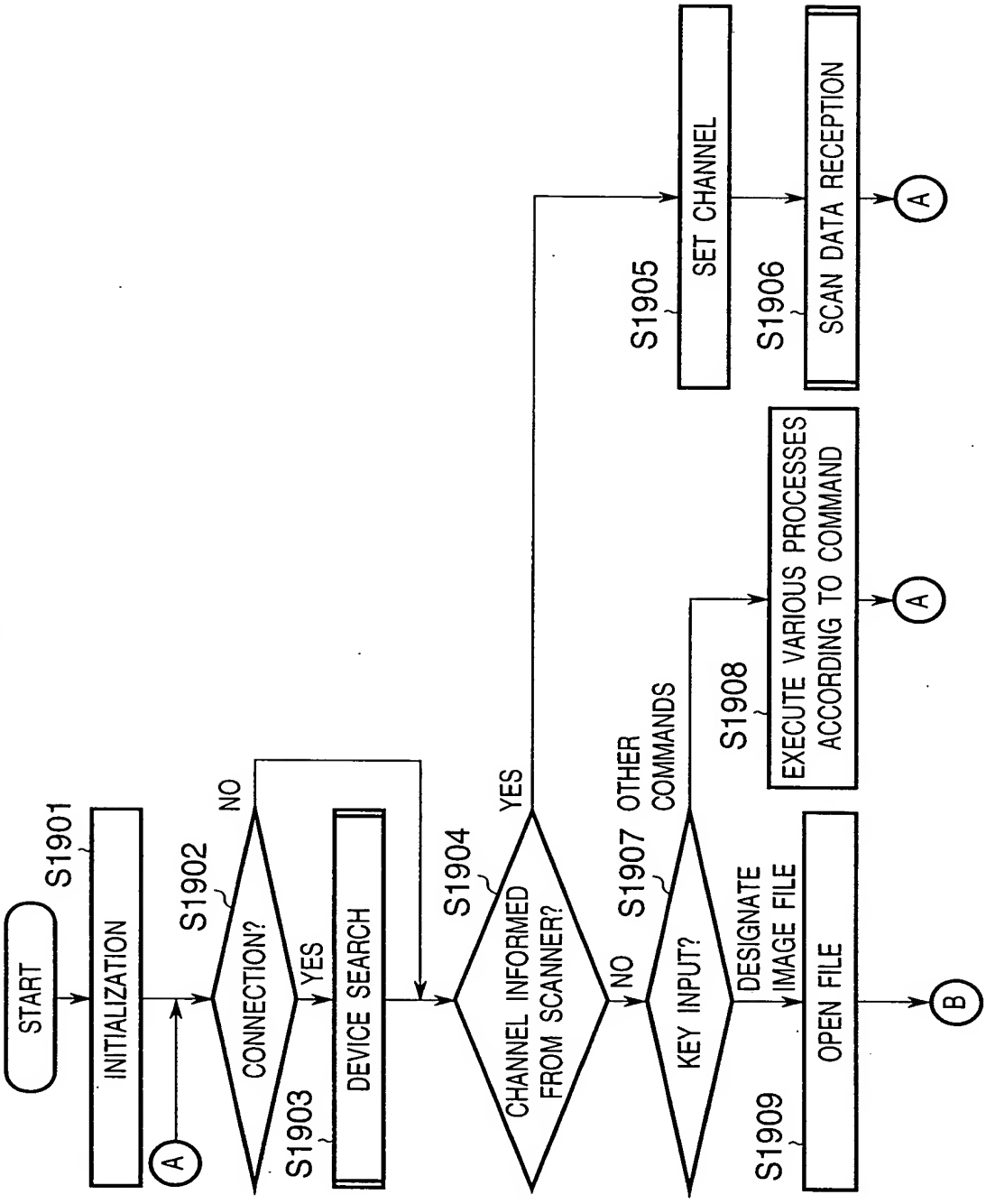

START
S1901
INITIALIZATION
A
S1902
CONNECTION?
NO
YES
S1903
DEVICE SEARCH
S1904
CHANNEL INFORMED FROM SCANNER?
YES
NO
S1905
SET CHANNEL
S1906
SCAN DATA RECEPTION
A
S1907
KEY INPUT?
OTHER COMMANDS
S1908
EXECUTE VARIOUS PROCESSES ACCORDING TO COMMAND
A
DESIGNATE IMAGE FILE
S1909
OPEN FILE
B

FIG. 19B

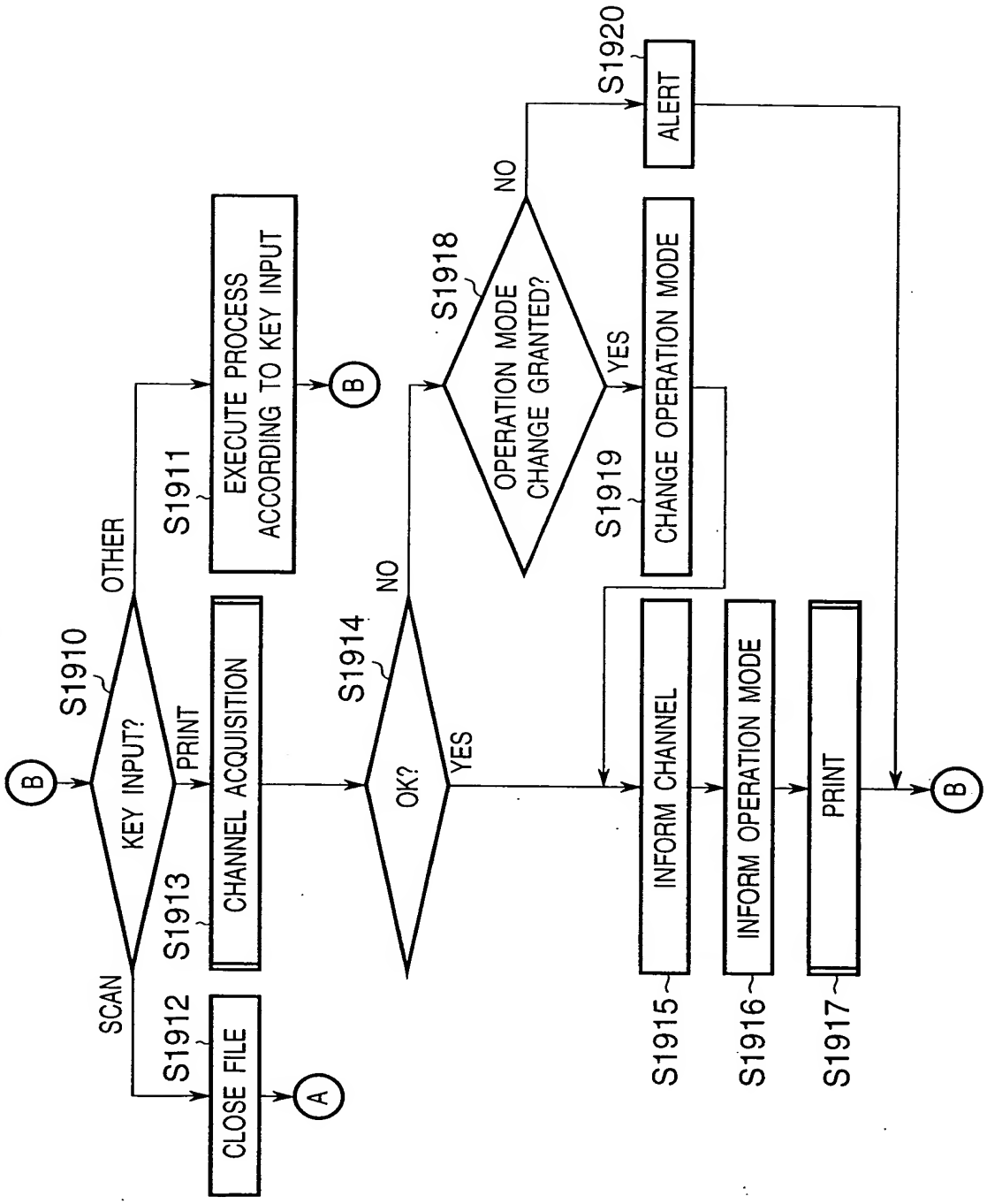

B
S1910
KEY INPUT?
OTHER
PRINT
SCAN
S1911
EXECUTE PROCESS ACCORDING TO KEY INPUT
B
S1913
CHANNEL ACQUISITION
S1912
CLOSE FILE
A
S1914
OK?
NO
YES
S1918
OPERATION MODE CHANGE GRANTED?
NO
YES
S1920
ALERT
S1919
CHANGE OPERATION MODE
S1915
INFORM CHANNEL
S1916
INFORM OPERATION MODE
S1917
PRINT
B

FIG. 20

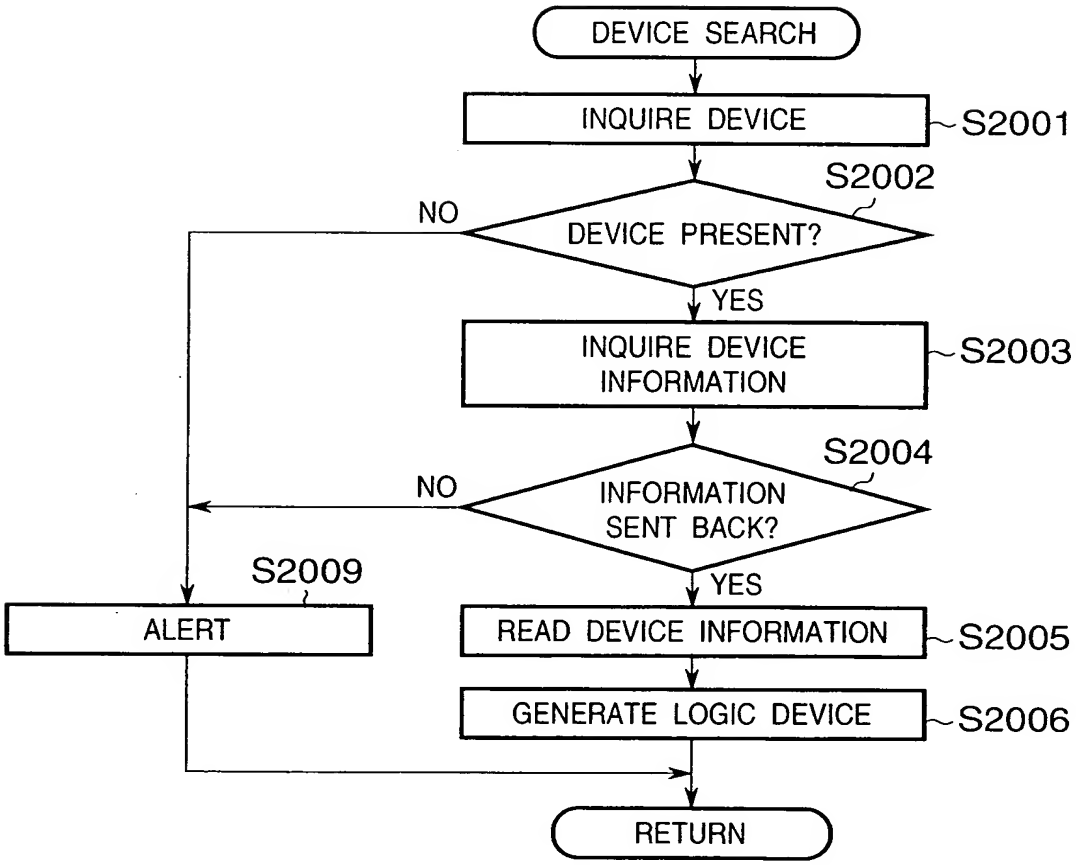

DEVICE SEARCH
INQUIRE DEVICE
S2001
S2002
DEVICE PRESENT?
NO
YES
INQUIRE DEVICE INFORMATION
S2003
S2004
INFORMATION SENT BACK?
NO
YES
S2009
ALERT
READ DEVICE INFORMATION
S2005
GENERATE LOGIC DEVICE
S2006
RETURN

FIG. 21

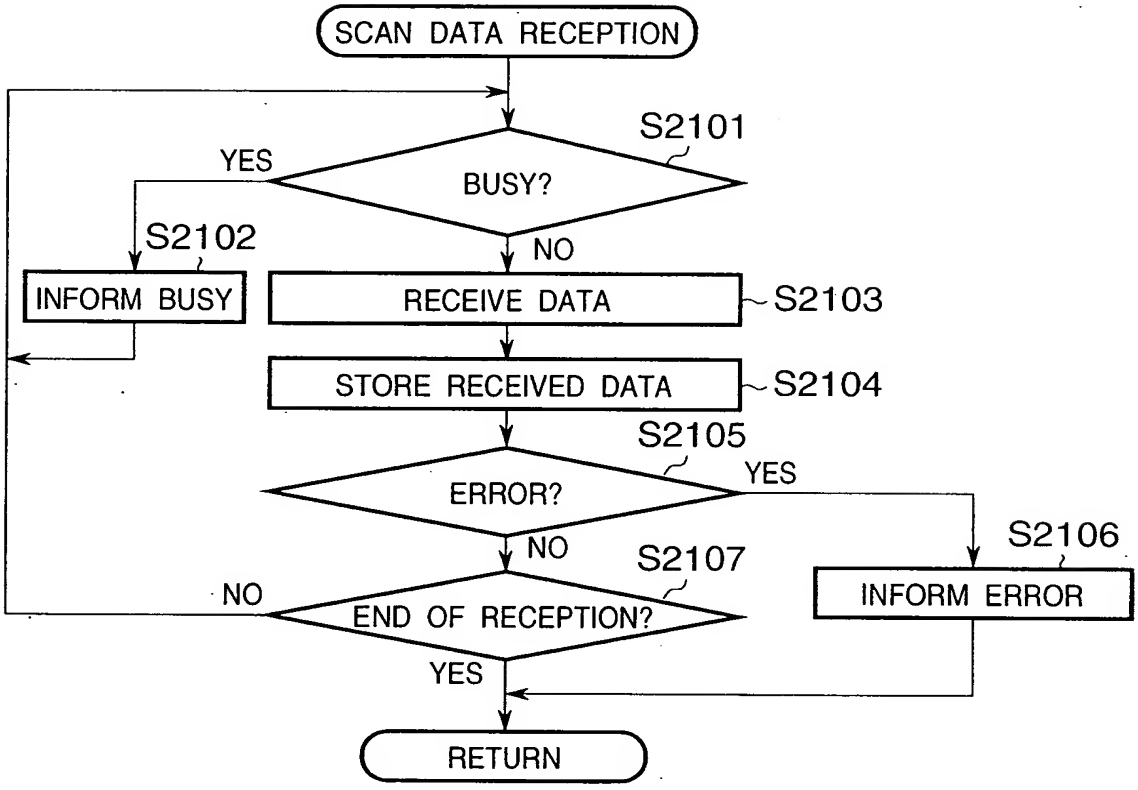

SCAN DATA RECEPTION
S2101
BUSY?
YES
NO
S2102
INFORM BUSY
RECEIVE DATA
S2103
STORE RECEIVED DATA
S2104
S2105
ERROR?
YES
NO
S2106
INFORM ERROR
S2107
END OF RECEPTION?
NO
YES
RETURN

FIG. 22A

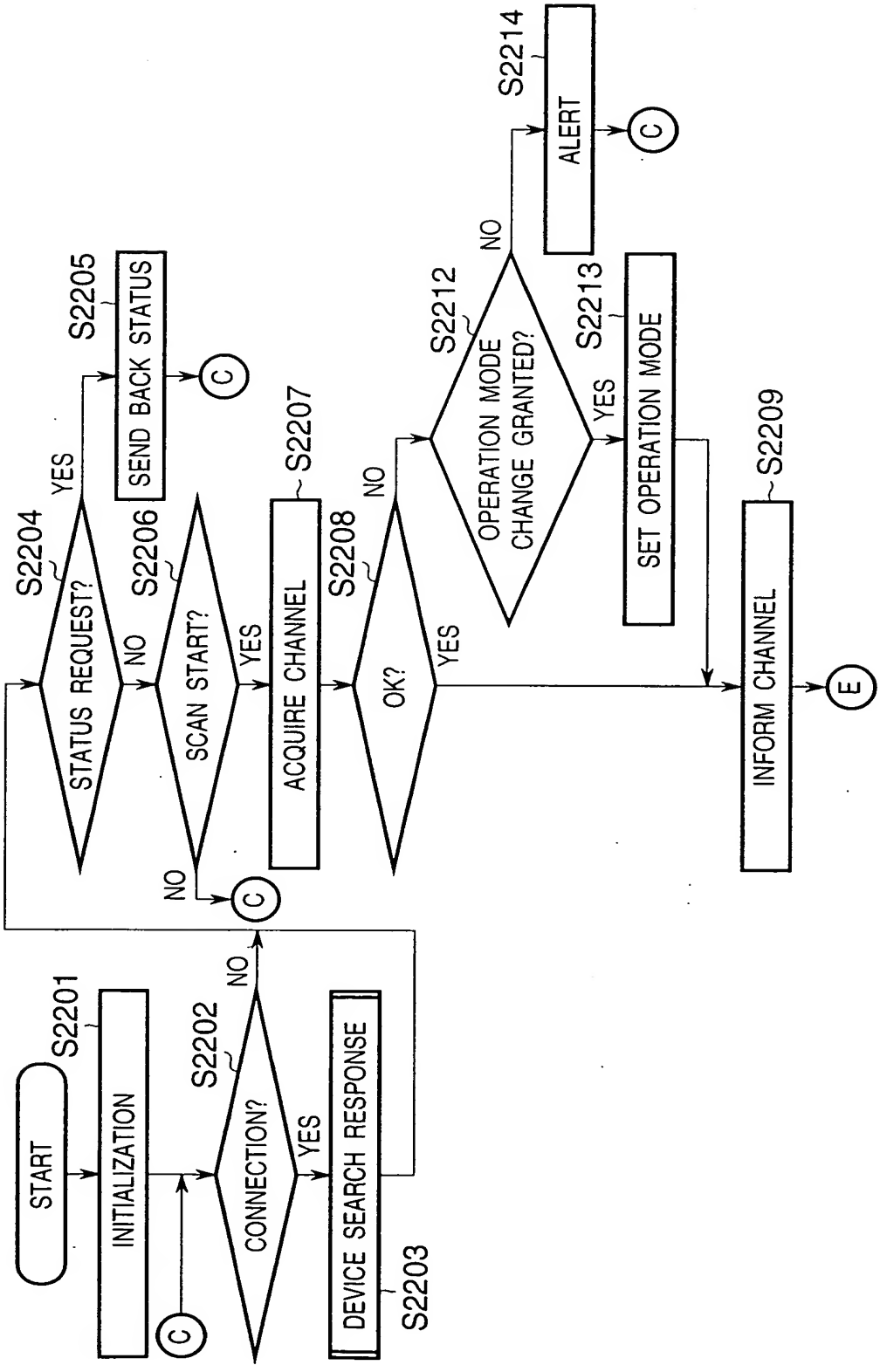

START
S2201
INITIALIZATION
S2202
CONNECTION?
NO
YES
S2203
DEVICE SEARCH RESPONSE
S2204
STATUS REQUEST?
YES
NO
S2205
SEND BACK STATUS
S2206
SCAN START?
YES
NO
S2207
ACQUIRE CHANNEL
S2208
OK?
NO
YES
S2212
OPERATION MODE CHANGE GRANTED?
NO
YES
S2213
SET OPERATION MODE
S2214
ALERT
S2209
INFORM CHANNEL
C
E

FIG. 22B

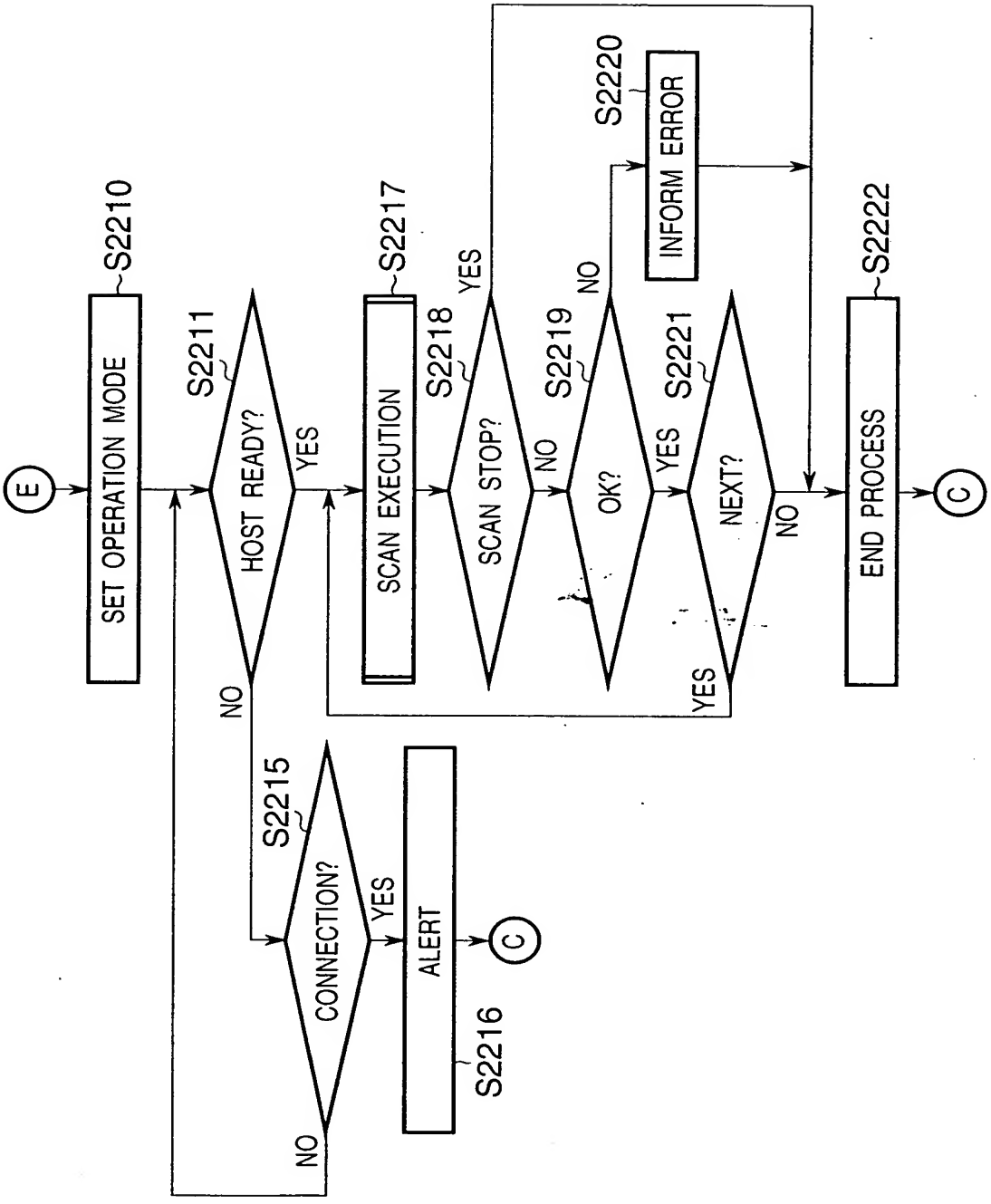

E
SET OPERATION MODE
S2210
HOST READY?
S2211
NO
YES
S2215
CONNECTION?
NO
YES
ALERT
S2216
C
SCAN EXECUTION
S2217
SCAN STOP?
S2218
YES
NO
OK?
S2219
NO
YES
INFORM ERROR
S2220
NEXT?
S2221
YES
NO
END PROCESS
S2222
C

FIG. 23A

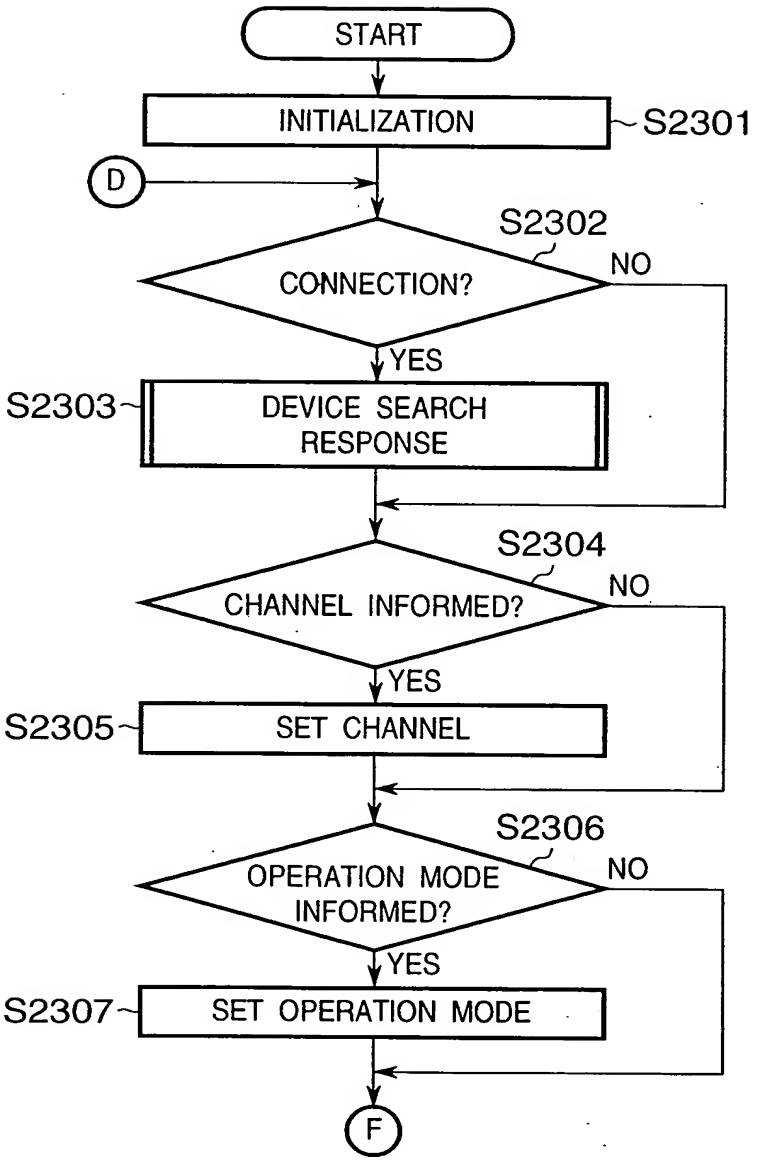
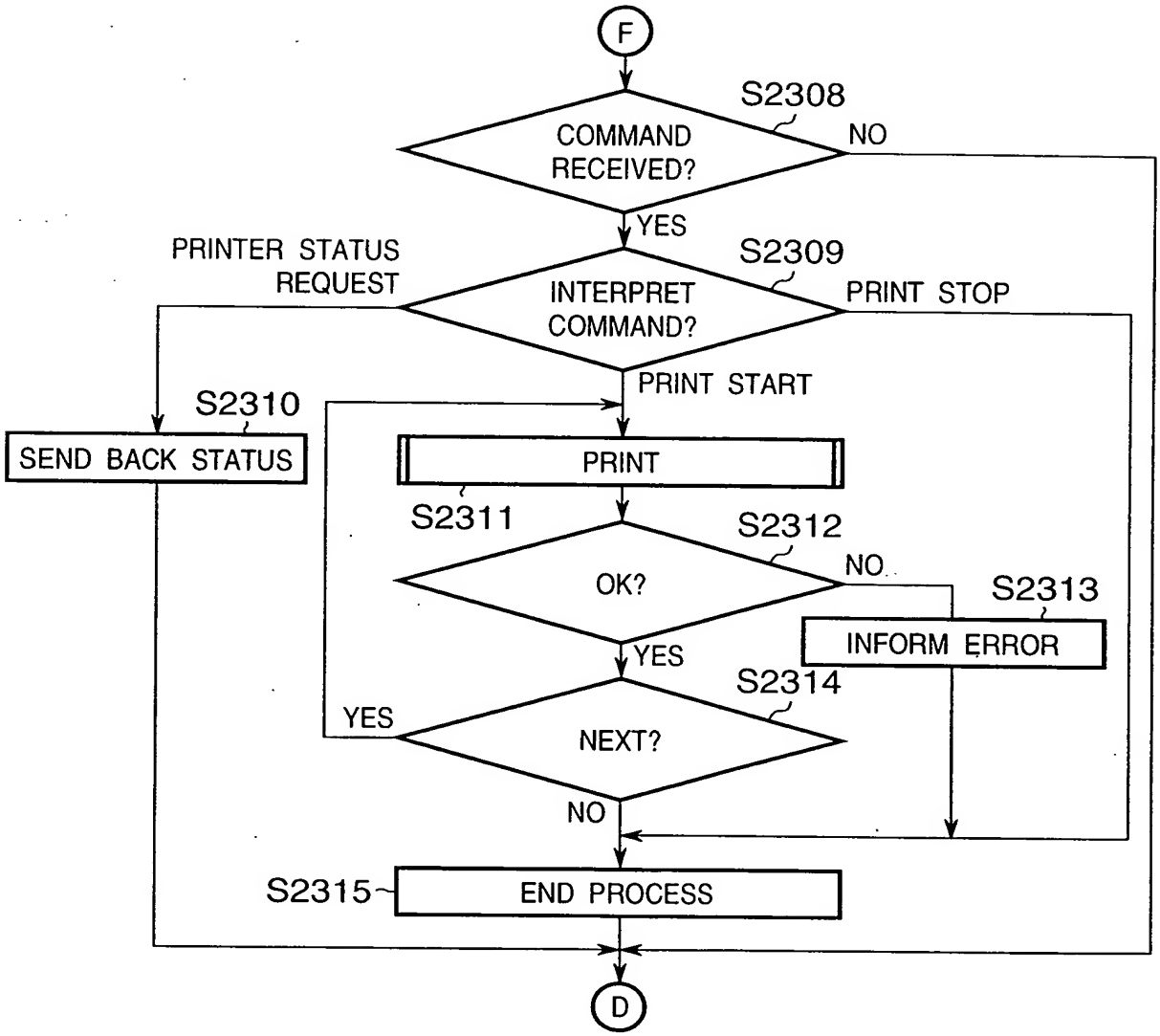
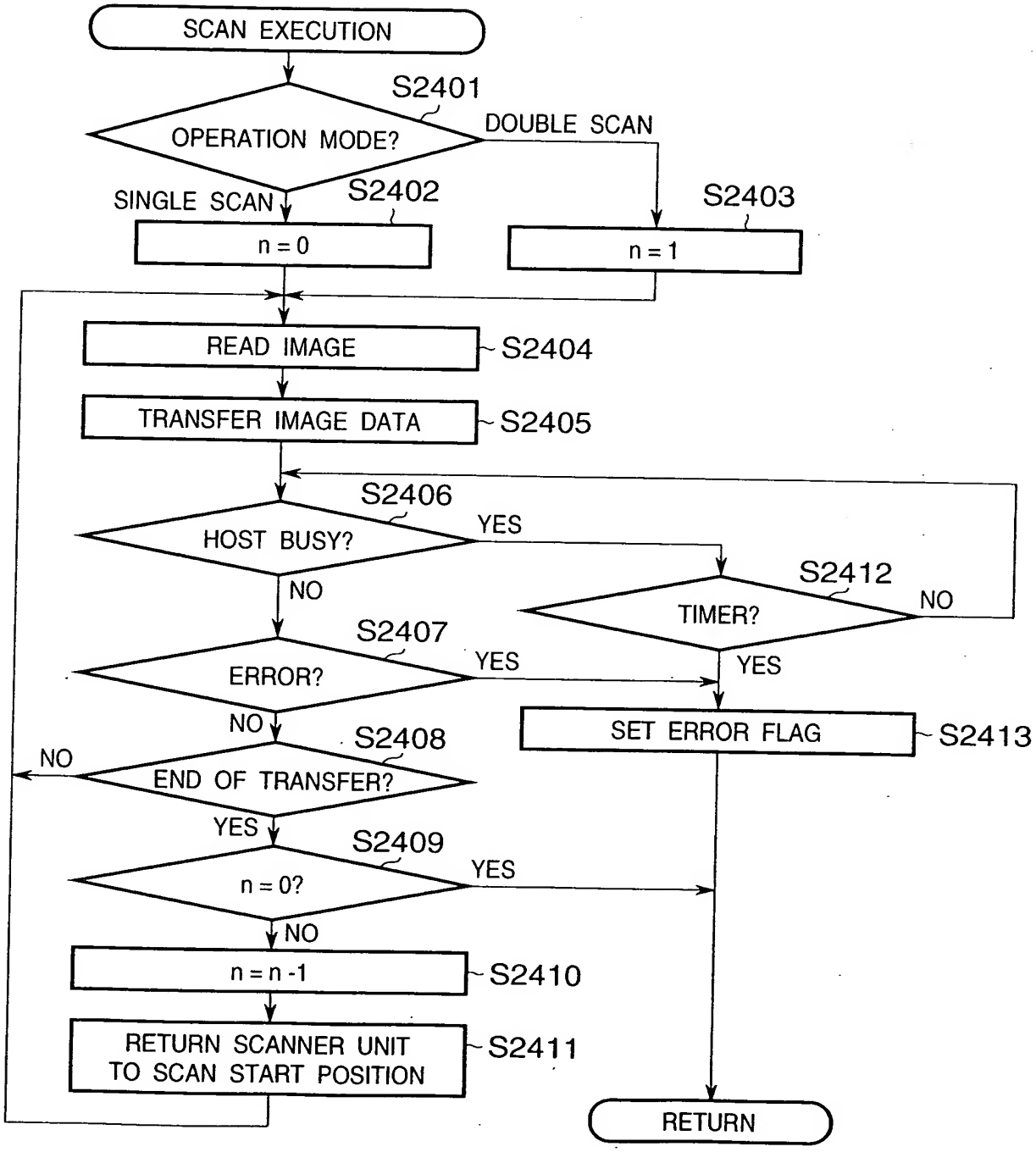

START
INITIALIZATION
S2301
D
S2302
CONNECTION?
NO
YES
S2303
DEVICE SEARCH RESPONSE
S2304
CHANNEL INFORMED?
NO
YES
S2305
SET CHANNEL
S2306
OPERATION MODE INFORMED?
NO
YES
S2307
SET OPERATION MODE
F

FIG. 23B


F
S2308
COMMAND RECEIVED?
NO
YES
PRINTER STATUS REQUEST
S2309
INTERPRET COMMAND?
PRINT STOP
PRINT START
S2310
SEND BACK STATUS
PRINT
S2311
S2312
OK?
NO
S2313
INFORM ERROR
YES
S2314
YES
NEXT?
NO
S2315
END PROCESS
D

# FIG. 24


SCAN EXECUTION
S2401
OPERATION MODE?
DOUBLE SCAN
SINGLE SCAN
S2402
n = 0
S2403
n = 1
READ IMAGE
S2404
TRANSFER IMAGE DATA
S2405
S2406
HOST BUSY?
YES
NO
S2412
TIMER?
NO
YES
S2407
ERROR?
YES
NO
SET ERROR FLAG
S2413
S2408
NO
END OF TRANSFER?
YES
S2409
n = 0?
YES
NO
n = n -1
S2410
RETURN SCANNER UNIT
TO SCAN START POSITION
S2411
RETURN